

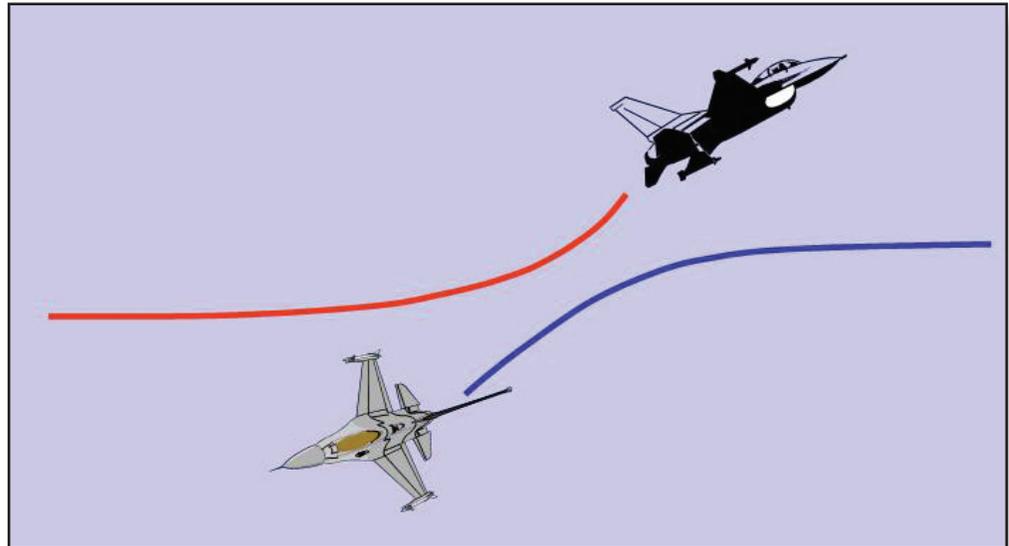


Air Force Research Laboratory | AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

AFRL COMPLETES FIRST AUTOMATIC AIR COLLISION AVOIDANCE SYSTEM



The Automatic Air Collision Avoidance System (Auto ACAS) uses linked navigational data and sensor data to detect imminent collision and automatically steer an aircraft evasively. Potentially, it could save the Air Force (AF) millions of dollars in air vehicle losses.



Air Force Research Laboratory
Wright-Patterson AFB OH

Accomplishment

AFRL partnered with the Swedish government to successfully complete Auto ACAS. Other organizations involved in developing and testing Auto ACAS included the Air Force Flight Test Center, Bihrl Applied Research, Boeing, Lockheed Martin, the National Aeronautics and Space Administration, General Dynamics, Saab, and the US Air Force Test Pilot School. Through four flight test demonstrations, this new collision avoidance system proved effective in collision prevention without relying upon pilot input. During the first three flight demonstrations, an F-16 with Auto ACAS was data-linked to a ground computer simulating a second F-16.

Auto ACAS successfully steered the piloted F-16 away from a collision with the virtual aircraft. This method of testing Auto ACAS enabled engineers to collect large amounts of data while using less fuel, increasing flight test safety, and decreasing the time required to set up each test run. During the fourth flight demonstration, Auto ACAS used data link information between two piloted F-16 aircraft, both outfitted with Auto ACAS, to prevent a collision. Auto ACAS also used inputs from an F-16's radar to steer it clear of a collision with a second F-16 unequipped with Auto ACAS.

AFRL engineers are studying the integration of Auto ACAS with the previously developed Automatic Ground Collision Avoidance System. The resulting system would provide collision safety for many different air and ground collision scenarios. Cost analysis shows that retrofitting this combined collision avoidance system into various aircraft could save the AF hundreds of millions of dollars in aircraft losses. Lockheed Martin engineers are studying the costs and processes related to integration of this combined collision avoidance system into the F-35 Joint Strike Fighter design.

Background

Midair collisions are a major cause of AF fighter aircraft loss. Prior to Auto ACAS, collision avoidance systems provided audio and visual guidance to pilots but still required manual action. Such warnings worked well for slow-maneuvering transport aircraft but were ineffective for fighter aircraft, whose mission requires close-formation flying and aggressive maneuvering in the vicinity of other aircraft. Auto ACAS solves this problem. It takes control after the pilot has missed the chance to avoid a collision manually, performs an aggressive maneuver to avoid the collision, and then returns control to the pilot.

Additional Information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (05-VA-12)

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